
CONTRIBUTIONS
TO
ORTHOPÆDIC SURGERY.

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AND

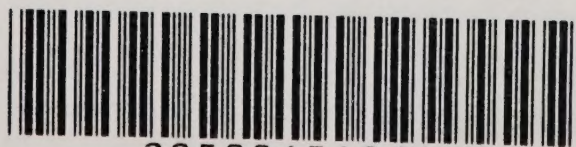
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THE AMERICAN ORTHOPÆDIC ASSOCIATION.

2.

SPONDYLITIS: ITS SYMPTOMS AND DIAGNOSIS

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II.

Spondylitis: its Symptoms and Diagnosis.

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2. SPONDYLITIS: ITS SYMPTOMS AND DIAGNOSIS.

SPONDYLITIS, also called Pott's disease, spinal caries, etc., may be the result of injury, syphilis, or tubercle; or it may follow scarlet fever, measles, whooping cough, or other



FIG. 1.—Spondylitis of dorsal region.

infectious disease, and may be dependent, primarily, upon their bacilli; but however it begins, or whatever be its specific origin, the symptoms presenting and the indications for treatment are practically almost identical, and all cases sooner or later show evidences of the presence of the tubercular bacillus. The disease may perhaps commence in any of the connective tissues composing the spinal column but there is little satisfactory evidence to show that it ever begins elsewhere than in the cancellous tissue, or upon the anterior aspect, of the vertebral bodies. Very rarely has the

disease been found so placed as to render it a fair assumption that its origin was either in the intervertebral discs, the laminae articular facets, or processes (fig. 2).

In traumatic cases the early symptoms vary with the injury received; the late symptoms are those of an ordinary tubercular case. Spondylitis arising without assignable cause in very young children, cases of multiple joint disease, where spondylitis is present at two points separated by one or more healthy vertebrae, or co-existing with disease at some other joint, and spondylitis in cases notoriously syphilitic, may be suspected of owing their origin to syphilis rather than to tubercle, and suitable for the administration of large doses of mercury and iodide of potash. It is only in the improvement which follows this treatment that they materially differ from the ordinary tubercular cases. Those which follow scarlet fever, measles, etc., show no peculiarities except a proneness to early suppuration. The

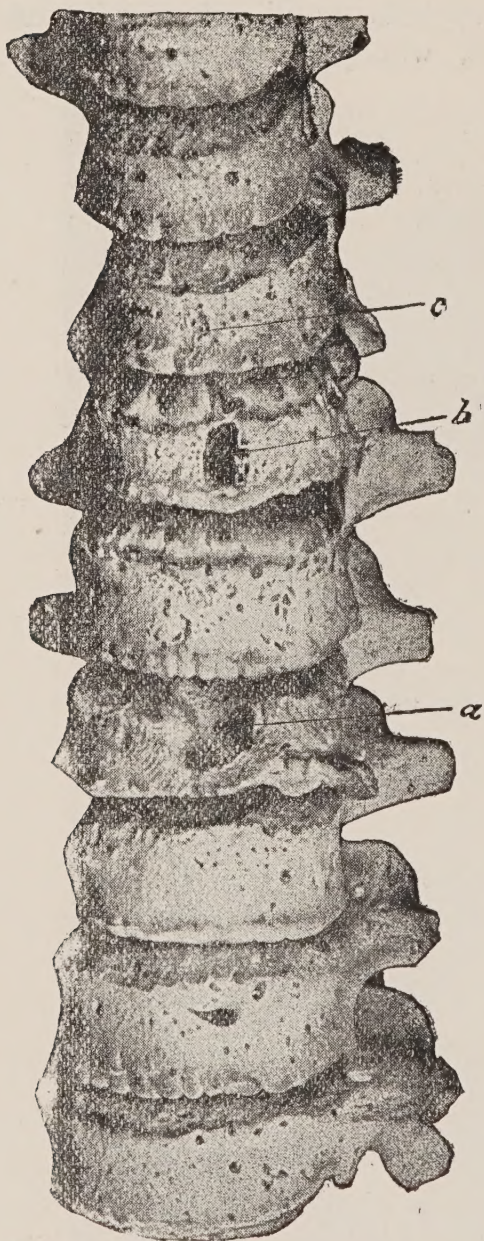


FIG. 2.—Foci of disease starting in anterior part of vertebral lobes. "Die Tuberkulose der Knochen und Gelenke" (Krause).

ordinary tubercular case presents the irritative symptoms indicative of inflammation in the vertebral bodies. These will be discussed in detail under "Symptoms."

The principles of treatment are immobilization and relief from pressure; in a word, *physiological rest of the diseased part*. The means which the surgeon employs to secure this physiological rest will be discussed under "Treatment."

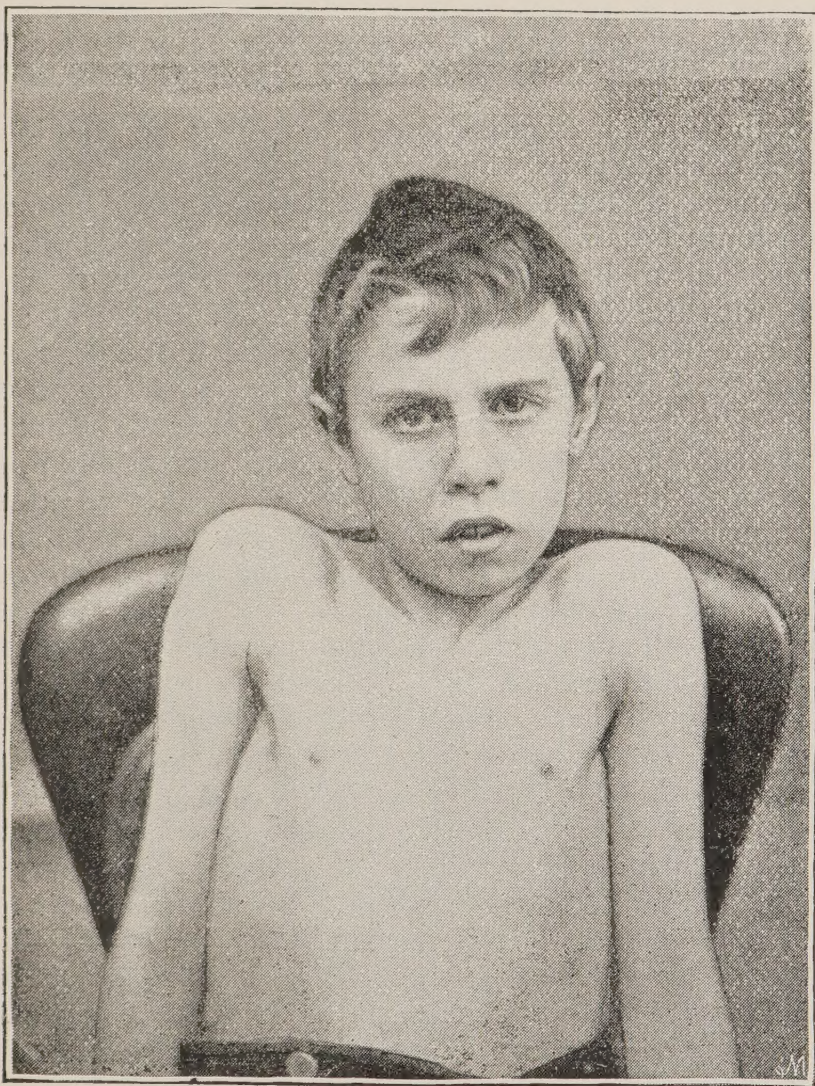


FIG. 3.—Showing the look of pain and fatigue.

Symptoms in General.—Certain symptoms are common to the disease in whatever part of the spine it may be; certain other symptoms are peculiar to the part affected, and these latter will be enumerated under their respective headings. The symptoms common to the disease in any part of the spine are as follows: "The face often expresses apprehension, pain, and premature old age (fig. 3); the patient

walks and moves with care, as if to avoid any jar or sudden movement ; there is a history of uneasiness, fretting, and irritability, and, for some time, the patient has been averse to his usual active exercises, and has been easily fatigued. Distant pain in the terminal filaments of the nerves, whose motor branches go to supply the muscles which control motion of the spine at the point of disease, is generally present though sometimes absent, as may also be restlessness, crying, and screaming during the first hours of sleep. Deformity may or may not have been noticed ; and the complications, abscess and paralysis, may or may not have appeared.

For the proper examination of a patient he should be stripped naked. Girls who have reached the age of puberty, and women, should receive certain consideration, and it is the custom to examine such with the back alone bared. It is convenient to have the undershirt put on in front, as an apron, with the sleeves pinned or tied about the neck ; the skirts can then be dropped to a level with the great trochanters and fastened by a piece of bandage around the hips. The back is then inspected for lateral deviation, excurvation, or prominent vertebræ. If any be found, the disease may be suspected at the *middle* of the curvature ; but it must be remembered that easily demonstrable spondylitis is present, usually for some months, before deformity of the spinal column is apparent. All of the normal motions should now be tested, both actively and passively ; the head should be rotated to the right and to the left, the shoulders twisted in the same directions, while the pelvis is held steady by the surgeon ; the spine should be bent forward and backward, to right and to left. Any portion which shows rigidity to *all* the normal motions is, or has been, the seat of an inflammatory process ; but if there be rigidity to bending in one direction only, or if bending even in one direction be normally free, the diagnosis of spondylitis is rendered extremely doubtful. It is upon this rigidity, which for some time is due solely to involuntary muscular spasm, that the diagnosis must depend ; it is ever present, both sleeping and waking, and nothing abolishes it except profound anæsthesia, and, at times, the termination of the inflammatory process. It is the first symptom to appear and the last to disappear ; and when, and *only* when, it is no longer present, can a cure be safely predicted (fig. 4).

There seems to be an almost universal belief among the profession, and this belief has been fostered by nearly all teachers and writers on general surgery, that the most early and constant—in fact, *the* diagnostic—symptom of spondy-

litis is *tenderness on pressure over the point of disease*. There is no lack of knowledge as to the pathological anatomy ; it is perfectly well known that the lesion is confined to the vertebral bodies, and usually to their anterior portions. It is therefore quite impossible that there should be tenderness on pressure over the spinous or transverse processes. Unless, then, there be disease of the processes or laminae, an exceedingly rare condition ; or unless an abscess, which will not be readily detected by palpation, be present, *tenderness on pressure will not be found in spondylitis*. In a doubtful case its presence must count as an important symptom against *true* spondylitis.

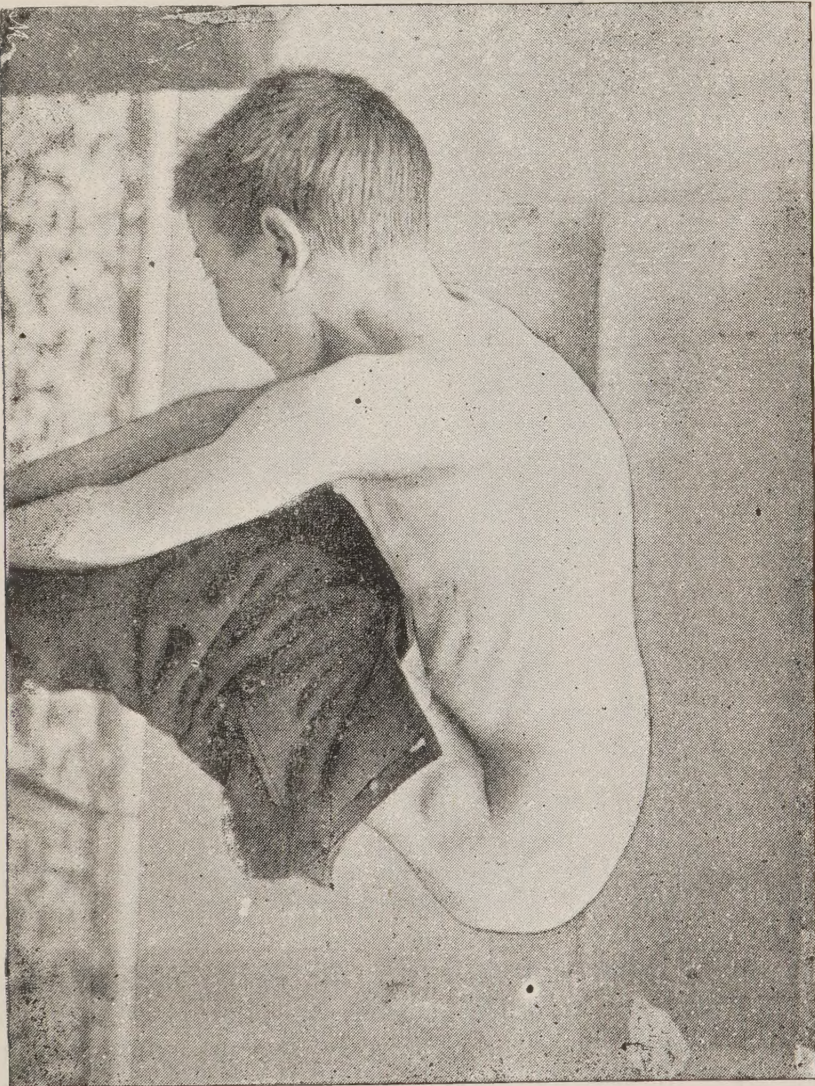


FIG. 4.—Showing rigidity of lower dorsal and upper lumbar vertebræ without angular deformity.

Downward pressure and concussion on the head, and sudden twisting of the spine, by wrenching at the shoulders when the patient is off his guard, are tests as unnecessary as

harmful. They will not be found to be of any value in the very early period, and can scarcely fail to inflict injury as well as pain upon the patient when the disease is at all advanced.

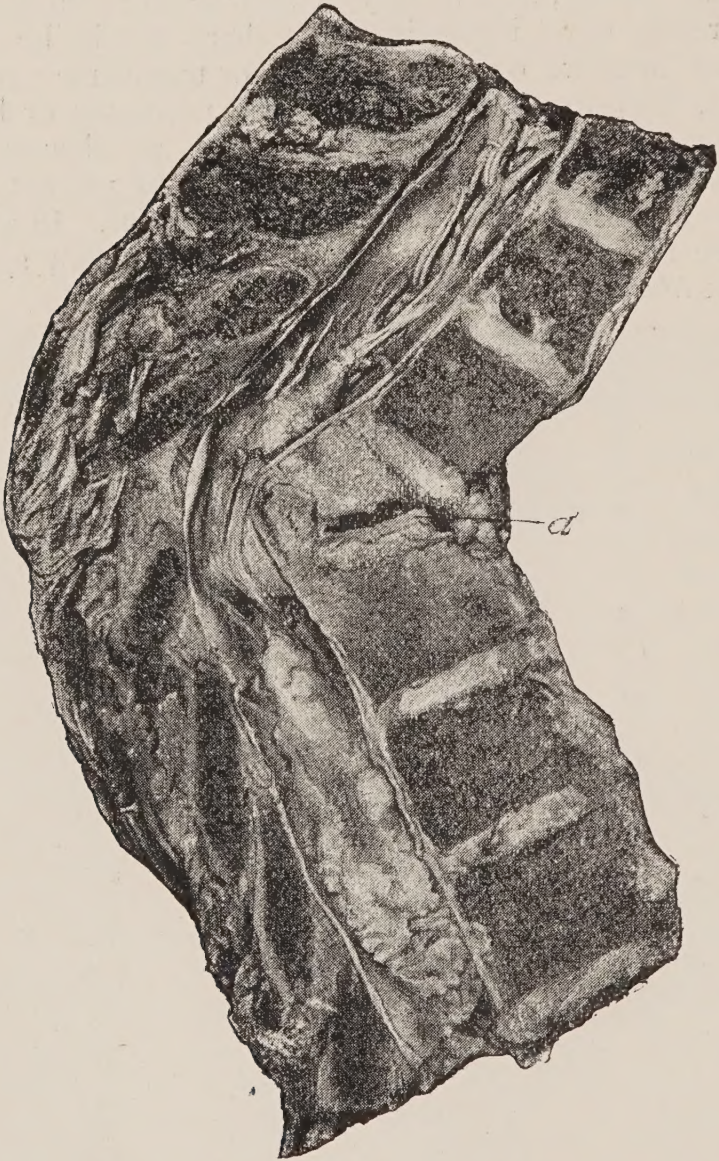


FIG. 5.—Caries of lower dorsal spine, shewing complete destruction of one of the bodies. “Die Tuberkulose der Knochen und Gelenke” (Krause).

Sooner or later deformity of the spine appears, and a lateral curve, with or without twisting of the vertebræ (rotation), often appears before kyphosis, the so-called “angular curvature,” makes its appearance. If one, two or three vertebræ only be affected, and if the destructive process has been considerable, the deformity approximates an angle (fig. 5); but if several vertebræ are diseased, each in only a slight degree, the deformity will be a curve.

Motor paraplegia affecting both lower extremities, at times the bladder and rectum, and occasionally the upper extremities, may come on *before* the bony deformity, or *with* the deformity, or comparatively *late* in the disease. It is generally due to thickening of the membranes of the cord from the contiguity of the inflammation in the bone, or to an actual infiltration with tubercular material. The pressure resulting is generally confined to the anterior columns of the cord, and sensation is rarely affected. Paraplegia occurs most frequently when the disease is in the upper dorsal region. It bears no relation to the acuteness of the angle; it may disappear while the bony deformity goes on increasing; and it has seldom been shown to depend upon bony pressure. The paraplegia is characterised by an exaggeration of all the tendon reflexes in the affected extremities, a tonic spasm of all the muscles, and an inability, more or less complete, to move any portion of the affected parts.



FIG. 6.—The head held rigid.

Although collections of tubercular material are almost always found to some extent, the typical tubercular abscess does not always appear. Abscess is most frequently seen when the disease is in that part of the spine below the diaphragm, less frequently in disease of the cervical region,

and still less frequently in disease of the dorsal spine. The abscess may make its way in any direction, opening externally, or into any of the open or closed cavities of the body, or it may become absorbed even after it has attained very considerable proportions.

Cervical Spondylitis is most frequently found in the upper two or three vertebræ. When it is suspected, before deformity has occurred, in very young children, the child should be examined by placing him across the parent's knees. If disease exists the child will not let the head dangle, no matter how prolonged the examination may be.

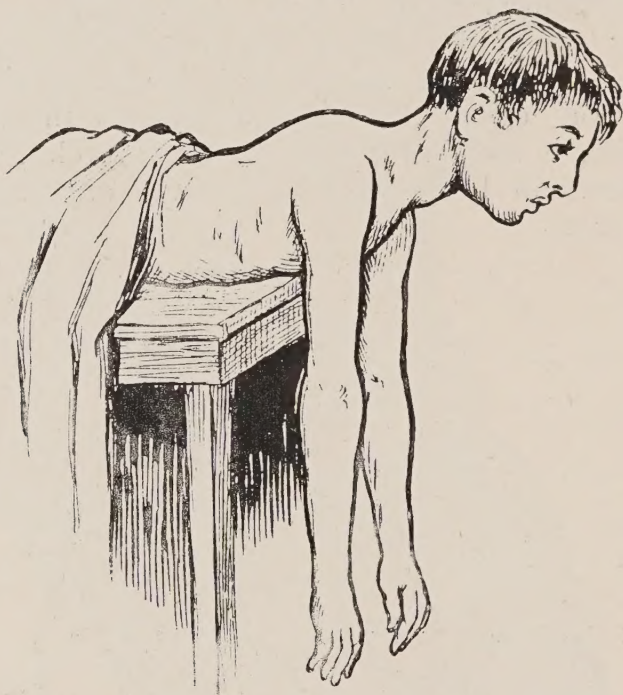


FIG. 7.—Head held rigid.

If placed supine he will show no inclination to bend the head towards the sternum as in the first act of rising. As the disease advances deformity occurs. If the upper portion of the cervical spine be affected twisting of the head may be expected (fig 8). With disease somewhat lower down the head is advanced, the chin dropped towards the chest (fig. 9), an angular projection of the spine at the diseased point may be felt, and the posterior spinal muscles stand rigidly out and may simulate an abscess in appearance; when the disease is still lower down the chin is elevated (fig. 10) and relatively somewhat advanced, and the head is thrown back towards the shoulders, and in extreme cases may rest upon them. The face expresses apprehension (fig. 3), and the head is moved, if the patient can move at all, with anxious care; he rarely tries,

however, preferring to turn without distressing the diseased area. All motions, both active and passive, at the point of disease are restricted or wholly abolished. Pain may be complained of running up the back of the neck and head, down the arms, or in the chest. Abscess does not frequently occur; when it does it usually points on one or the other side of the neck (see fig. 10) behind the sternomastoid, or it may point in the pharynx, which need not, however, be examined unless some symptom point to abscess in that neighbourhood.



FIG. 8.—Head twisted in cervical spondylitis very high up.



FIG. 9.—Chin thrown towards chest in disease lower down.

Before its formation the finger in the throat reveals nothing, it is very repulsive to the patient, and the normal prominence of the vertebral bodies may mislead the surgeon. Paraplegia is seldom a complication. Occurring, it may affect the lower extremities alone, as is the rule, or the upper extremities as well. Striking downward upon the top of the head with the open palm to test the sensitiveness of the vertebræ is a useless and a most barbarous procedure.

Dorsal Spondylitis is much more frequent than disease in the cervical or lumbar regions. Before the appearance of kyphosis the diagnosis must depend: upon the persistent distant pain, often treated for many months as gastric pains; upon a disinclination to indulge in rough play; a growing tendency to stand with the elbows resting on a chair or

table ; a grunting respiration ; and upon an inability either to rise from a stooping posture or pick up an object from the floor without resting the hand upon the knee (fig. 11).



FIG. 10.—Head elevated in cervical disease. Cicatrix of abscess behind sterno mastoid.



FIG. 11.—Patient cannot stoop because of spinal rigidity.

Any distant pain, which does not yield readily to the proper medication, should lead to a careful examination of the spine. Often there is crying when the child is lifted, and cough accompanying a grunting respiration. If the upper two or three dorsal vertebræ be those involved, the head may be thrown backward and the neck held rigid against forward or lateral bending ; and paraplegia may even come on before any kyphosis can be made out. When the disease arises in the lower dorsal region, the patient may limp and complain of pain in the thigh, as in hip disease, and this before any deformity is noted.

Lateral deviation of the column, with or without rotation of the vertebræ, is often present before the antero-posterior deformity appears (fig. 12). In very young children, before any spinal deformity has appeared, it is convenient to examine them by placing them across the separated knees of the parent. If there is disease the spine will not form an anterior curve in the normal way. If placed sitting upon a table with the knees straight, the child will not bend forward, by arching the spine in the usual way. The patient is disinclined to forward bending, and, when picking up an

object from the floor, squats with rigid spine, instead of stooping, and evinces weakness on rising, often regaining the erect posture only by climbing hand over hand up his own legs (fig. 13).

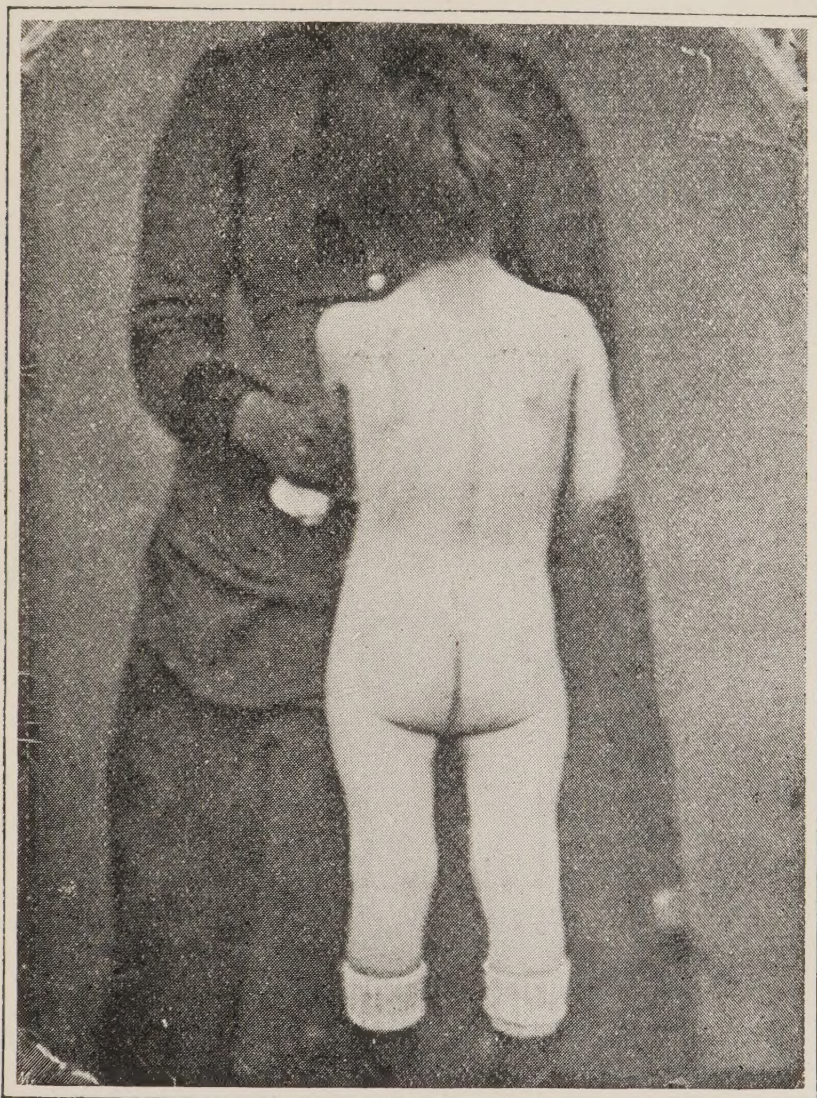


FIG. 12.—Showing lateral deviation which often precedes angular curvature.

When kyphosis has appeared, however, the diagnosis will be readily made, for, in addition to the peculiar and striking deformity, all the symptoms heretofore mentioned are likely to be found on careful investigation. Sooner or later projection forward of the chest takes place compensatory and proportionate to the angular deformity at the back.

Paraplegia, which is more common when disease is in the upper dorsal spine than elsewhere, may come on early before any deformity has appeared, or at any time during the course

of the affection or during its latest stages, and, having disappeared, may recur again and again. It begins with exaggeration of the tendon reflexes, stumbling in walking, increasing lack of muscular control, and goes on until all control over the lower extremities is lost and the limbs are held rigidly extended; at times they are drawn up with spasmodic crampings, and may suddenly, without the



FIG. 13.—Patient rests on knees in getting up, and when fatigued.



FIG. 14.—Compulsory projection of chest.

patient's volition, be extended with a jerk. Passive flexion at the ankle induces marked ankle-clonus. On rare occasions the sensory nerves and, at the same time, the bladder and rectum are affected.

Abscess does not frequently appear when the disease is above the diaphragm, although, it is probable, that tubercular collections form to some extent in all cases; when the abscess does present, it usually makes its appearance from between the ribs, at a distance of two to four inches, from the line of the spinous processes (fig. 15); rarely, however, it makes its way downward before appearing at the surface. In disease of the lower dorsal vertebræ the abscess usually follows the course of the psoas muscle, travelling downwards in the posterior mediastinum under the ligamentum arcuatum internum of the diaphragm, and thus passing into the psoas sheath.

Lubar Spondylitis is less frequent than disease in the dorsal, but more frequent than disease in the cervical region. Lumbar spondylitis is usually first recognised by an awkward gait, a limp, and a slight lordosis. The shoulders are thrown backward, the foot is slightly advanced, and the patient walks with care and holds his spine rigid. He is even less inclined than in dorsal disease to forward bending. If there be pain, it is usually felt down the



FIG. 15.—Showing cicatrix of healed dorsal abscess. anterior and inner surfaces of the thigh. Most of the symptoms, enumerated as characteristic of disease in the dorsal region, will be found present. Contraction of one or both psoas muscles may come on before the formation of abscess, and before the appearance of kyphosis. It is in this early involuntary spasm of the psoas muscle, flexing

the thigh and limiting its extension, before the appearance of deformity, that leads to the mistaken diagnosis of hip disease even by experienced observers.

To test for contraction of the psoas muscle, the patient is placed prone upon the table, the pelvis is held firmly down with one hand, while with the other hand first one and then the other knee is lifted upwards. The freedom with which they can be raised, and the difference in extent



FIG. 16.—Large psoas abscess connected with dorsal region.

of movement, or the extent to which each of them differ from the normal, must be noted. Then with one hand upon the back, at about the tenth dorsal vertebræ, and the other hand lifting both knees at the same time, the rigidity of that part of the spine is noted. It is upon this rigidity that the diagnosis must depend. In healthy children the

spine can be bent backward so far that the thighs are at nearly a right angle with the upper dorsal spine.

Paraplegia is not common, owing, no doubt, to the fact that below the first dorsal the *dura mater* only accommodates nerves. The *cauda equina* does not occupy so large an area as the cord itself along with the nerves, leaving it in the higher regions of the spine. When paraplegia occurs, it in no way differs from that found complicating dorsal disease. Abscess is frequent, usually following the course of the psoas muscle, and pointing on the anterior surface of the thigh below Poupart's ligament, and opposite the insertion of the muscle (fig. 16.) When the disease is below the third lumbar vertebræ, the abscess may pass down and point in the buttock; this is due to the entrance of pus in the psoas sheath, where it is continuous with the sacral end of the pelvic fascia, and which passes down to the pyramidalis, and leaves the pelvis through the great sacro-sciatic foramen; or with disease in any portion of the lumbar vertebræ it may pass laterally, following the nerves, and point in the loin some inches from the spine.

Differential Diagnosis.—A strain may give rise to the early symptoms of spondylitis; for a strain, left untreated in a tubercular subject, may become a true tubercular spondylitis. A strain of course carries its distinct history.

A *rachitic* spine closely resembles the "rounded curvature" of spondylitis. The deformity is sometimes a rigid one, although usually in children the spine can be easily moulded into position. The curve is very rarely an angular one, but lateral deviation is more marked and more frequent than in a tubercular case. It is the most amenable of all varieties to treatment, and gives rise to no pain, nor does it ever result in paraplegia. It will be found to arise only in young children, and the child will nearly always present other evidences of rickets. The mistaking of a rachitic spine for spondylitis will, however, be of little harm to the patient, inasmuch as the rachitic spine demands a rigid support.

Scoliosis—lateral curvature—will not be mistaken for spondylitis, as the curvature is not usually rigid, until some time has elapsed, and the deformity has become very considerable. On the other hand spondylitis may be mistaken for lateral curvature, and the necessary immobilization withheld and, possibly, exercise advised. A slight lateral curve with or without rotation, if it be rigid, is probably a commencing spondylitis. Exercises should be withheld and a support applied, when a few months observation will clear

up the diagnosis. Whilst pain is rarely associated with



FIG. 17.—Rickety spine.

spondylitis of the upper cervical region. Still in many cases the diagnosis can be made almost at sight. In wry-

scoliosis, it is the rule in spondylitis, though it should not be forgotten that it may be absent in both. A careful circumferential outline of the chest may throw some light on the subject: in spondylitis it should be practically symmetrical; in scoliosis it very early becomes asymmetrical, bulging posteriorly on the side of the convexity of the curve and flattened posteriorly on the side of the concavity, whilst in front the conditions are reversed.

Torticollis is closely simulated at the first glance by



FIG. 18.—Chin pointing from prominent sterno-mastoid in torticollis.



FIG. 19.—Chin pointing towards prominent muscle in spondylitis.

neck the chin points *away* from the prominent sterno-mastoid muscle (fig. 18); in spondylitis it points *towards* that muscle (fig. 19), if only one sterno-mastoid be prominent. In spondylitis the movements of the head are restricted in

all directions; in torticollis only in one direction—that which puts the shortened muscles on the stretch.

Hip disease is not infrequently the diagnosis when contraction of the psoas muscle comes on in lumbar spondylitis prior to kyphosis. The patient walks with a limp, complains of pain in the groin or along the anterior surface of the thigh; the thigh is flexed on the pelvis, and attempts to overcome this flexion are resisted by involuntary muscular spasm, and give the patient pain. It will, however, be found that the thigh can be flexed to the normal degree, and that, when flexed sufficiently to fully relax the psoas muscle, rotation at the joint is free, painless, and normal. In a word, extension is the only motion at the hip joint that is limited by muscular spasm in lumbar spondylitis, whereas in hip disease motion in all directions is restricted.

The *hyperæsthetic* or *irritable* spine, if patiently and carefully examined, give no rigidity from involuntary muscular spasm. There is no true distant pain, the pain being confined to some portion of the spine itself and associated with tenderness on pressure. The lightest touch is often complained of more than firm deep pressure. The condition is most frequently found in young women, and may have existed unchanged for years. There is no true kyphosis.

Malignant disease of the spine, in its early stage, cannot be differentiated from spondylitis. The history of the case as to hereditary tendency, taken together with the patient's age and general appearance, may make the diagnosis of malignant disease probable; but nothing can be positively said until the progress of the case or the pressure of the tumour clears up the doubt.

Sacro-iliac disease is not of frequent occurrence, and its early symptoms are obscure. Muscular rigidity of the lumbar spine to bending in all directions will not be found unless the disease is associated with spondylitis of the lumbo-sacral articulation. Examination by the rectum should be made in all cases suspected of sacro-iliac inflammation.

The *typhoid spine* can of course be found only as a sequæla of typhoid fever. There is tenderness on pressure and on lateral and forward bending, no special pain in the nerve distribution, and no psoas contraction; the onset is sudden, the recovery rapid.

Prognosis.—As to deformity: In the cervical and dorso-lumbar (tenth dorsal to third lumbar inclusive) regions the deformity may, under favourable circumstances, be reduced if consolidation has not already taken place, and any further increase prevented if consolidation has commenced. If deformity has not yet occurred its appearance can of course be readily prevented, and, as a rule, a rapid cure can be

effected. In the upper dorsal region, comprising six vertebræ, the deformity may be expected to increase under any form of treatment with which we are familiar. From the sixth to the tenth an increase in deformity can generally be prevented, but can rarely be reduced. When the disease affects the lower lumbar region, the fourth and fifth vertebræ and sacrum, the deformity may be expected to appear and to increase up to a certain point, unless the patient be treated continuously in the recumbent posture until consolidation is well advanced. In a word, if the spine can be made straight and kept so sufficiently long for osseous matter to deposit in the space made vacant by the disease, and ankylosis free from deformity, or nearly so will result. In a few cases more or less restoration of the normal motion is gained.

As to paraplegia: In nearly all cases the paraplegia is due to the pressure of the inflammatory products in the neighbourhood of the bony tuberculosis; in these cases recovery may confidently be expected, if the patient be kept recumbent for a sufficiently long time, when shrinking of the new material takes place on the subsidence of the inflammation. Rarely the paraplegia is due to pressure from a displaced spicule of bone, but there is no evidence that it is ever caused by the acuteness of the angle of the canal. The authors have observed complete restoration of function to the paralysed limbs in a case, where the motor paralysis had been complete for nearly four years, and partial recovery in another recent case, where the sensory paralysis had existed for two and the motor paralysis for ten years. In all cases of paraplegia the surgeon is justified in making a most hopeful prognosis. Even where the patient is inefficiently treated or quite neglected recovery usually takes place. In children it is often the precursor of recovery as it ensures rest in a manner that nothing else can.

As to life: Although spondylitis is a most prolonged and serious disease the prognosis as to life is remarkably good. Only about 8 per cent. of cases receiving proper nursing and treatment die. Of these the cause of death in nearly all is tubercular meningitis or a general tuberculosis in which the meningeal symptoms play a most prominent part.

The duration of the disease in any particular case can not with accuracy be predicted. Treatment will be required for at least two years, and may be necessary for twice or thrice that length of time. The duration of the paraplegia is generally about a year; relapses of the paraplegia may occur, but are not frequent. The lack of an early diagnosis, and of early, energetic, and prolonged treatment may be considered as the cause of the marked deformity which ultimately results in so many cases.

By the same Authors:

MONTHLY CONTRIBUTIONS TO ORTHOPÆDIC SURGERY

1. "Principles of Treatment, with some Remarks on the Pathology of Chronic Joint Disease."
2. "Spondylitis: its Symptoms and Diagnosis" (*19 illustrations*).
3. "Spondylitis: its Mechanical and Operative Treatment" (*36 illustrations*).
4. "Sacro-Iliac Disease."
5. "Hip Disease: its Diagnosis and Mechanical Treatment" (*60 illustrations*).
6. "Diseases of the Knee and Ankle" (*35 illustrations*).
7. "Diseases of the Shoulder" (*13 illustrations*).

TO FOLLOW:

8. "Diseases of the Elbow, Wrist, and Hand."
9. "Anchylosis due to Old Arthritis."
10. "Lateral Curvature."
11. "Club-Foot."
12. "Surgical Treatment of Paralysis."

ETC., ETC.

